Interim

Developing Your Stormwater Pollution Prevention Plan

A Guide for Construction Sites

EPA 833-R-060-04
January 2007

Contents

Chapter 4: SWPPP Development—Selecting Erosion and Sediment Control BMPs

▶ **This chapter presents a brief discussion of erosion and sediment control principles and a discussion of some commonly used BMPs.**

This document is not intended as an engineering or design manual on BMPs. The engineer or other qualified person that develops the details of your sediment and erosion control plan should be using the appropriate state or local specifications. The descriptions below provide a kind of checklist of the things to look for and some helpful installation and maintenance hints.

Erosion and sediment controls are the structural and non-structural practices used during the construction process to keep sediment in place (erosion control) and to capture any sediment that is moved by stormwater before it leaves the site (sediment control). Erosion controls—keeping soil where it is—are the heart of any effective SWPPP. Your SWPPP should rely on erosion controls as the primary means of preventing stormwater pollution. Sediment controls provide a necessary second line of defense to properly designed and installed erosion controls.

The suite of BMPs that you include in your SWPPP should reflect the specific conditions at the site. The information that you collected in the previous steps should help you select the appropriate BMPs for your site. An effective SWPPP includes a combination or suite of BMPs that are designed to work together.

Ten Keys to Effective Erosion and Sediment Control (ESC)

The ultimate goal of any SWPPP is to protect rivers, lakes, wetlands, and coastal waters that could be affected by your construction project. The following principles and tips should help you build an effective SWPPP. **Keep in mind that there are many BMP options available to you. We have selected a few common BMPs to help illustrate the principles discussed in this chapter.**

Erosion Control (keeping the dirt in place) and Minimizing the Impact of Construction

1. **Minimize disturbed area and protect natural features and soil**
2. **Phase construction activity**
3. **Control stormwater flowing onto and through the project**
4. **Stabilize soils promptly**
5. **Protect slopes**

Sediment Controls (the second line of defense)

6. **Protect storm drain inlets**
7. **Establish perimeter controls**
8. **Retain sediment on-site and control dewatering practices**
9. **Establish stabilized construction exits**
10. **Inspect and maintain controls**

Take a Closer Look...

BMPs in Combination

BMPs work much better when they are used in combination. For instance, a silt fence should not be used alone to address a bare slope. An erosion control BMP should be used to stabilize the slope, and the silt fence should serve as the backup BMP.

What does this mean to me?

Wherever possible, rely on erosion controls to keep dirt in place. Back up those erosion controls with sediment controls to ensure that dirt doesn't leave your site. Continually evaluate your BMPs. Are they performing well? Could the addition of a supplemental BMP improve performance? Should you replace a BMP with another one that might work better? Using BMPs in series also gives you some protection in case one BMP should fail.

Erosion Control and Minimizing the Impact of Construction

ESC Principle 1: Minimize disturbed area and protect natural features and soil. As you put together your SWPPP, carefully consider the natural features of the site that you assessed in Chapter 3. By carefully delineating and controlling the area that will be disturbed by grading or construction activities, you can greatly reduce the potential for soil erosion and stormwater pollution problems. Limit disturbed areas to only those necessary for the construction of your project. Natural vegetation is your best and cheapest erosion control BMP.

Figure 7. Protect vegetated buffers by using silt fence or other sediment controls.

Protecting and preserving topsoil is also a good BMP. Removing topsoil exposes underlying layers that are often more prone to erosion and have less infiltration capacity. Keeping topsoil in place preserves the natural structure of the soils and aids the infiltration of stormwater.

ESC Principle 2: Phase construction activity. Another technique for minimizing the duration of exposed soil is phasing. By scheduling or sequencing your construction work and concentrating it in certain areas, you can minimize the amount of soil that is exposed to the elements at any given time. Limiting the area of disturbance to places where construction activities are underway and stabilizing them as quickly as possible can be one of your most effective BMPs.

ESC Principle 3: Control stormwater flowing onto and through your project. Plan for any potential stormwater flows coming onto the project area from upstream locations, and divert (and slow) flows to prevent erosion. Likewise, the volume and velocity of onsite stormwater runoff should be controlled to minimize soil erosion.

Example BMP: Diversion Ditches or Berms

Description: Diversion ditches or berms direct runoff away from unprotected slopes and may also direct sediment-laden runoff to a sediment-trapping structure. A diversion ditch can be located at the upslope side of a construction site to prevent surface runoff from entering the disturbed area. Ditches or berms on slopes need to be designed for erosive velocities. Also, ensure that the diverted water is released through a stable outlet and does not cause downslope or downstream erosion or flooding.

Installation Tips:

- Divert run-on and runoff away from disturbed areas
- Ensure that the diversion is protected from erosion, using vegetation, geotextiles, or other appropriate BMPs
- Divert sediment-laden water to a sediment-trapping structure
- Use practices that encourage infiltration of stormwater runoff wherever possible

Maintenance:

- Inspect diversions and berms, including any outlets, regularly and after each rainfall
- Remove any accumulated sediment

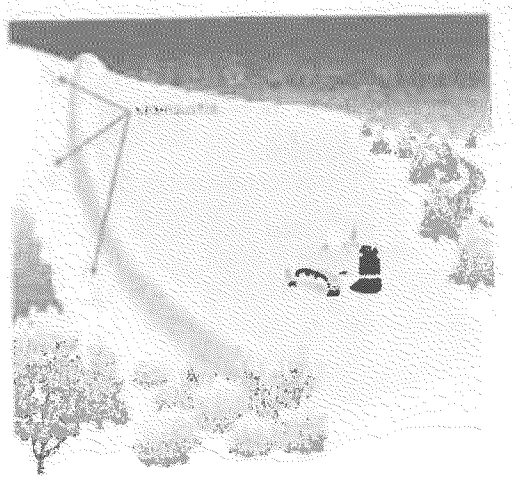


Figure 8. Illustration of a construction berm to divert stormwater away from the disturbed construction area.

ESC Principle 4: Stabilize soils promptly. Where construction activities have temporarily or permanently ceased, you should stabilize exposed soils to minimize erosion. You should have stabilization measures in place after grading activities have ceased (many permits require stabilization within a specified time frame). You can provide either temporary or permanent cover to protect exposed soils. Temporary measures are necessary when an area of a site is disturbed but where activities in that area are not completed or until permanent BMPs are established. Topsoil stockpiles should also be protected to minimize any erosion from these areas. Temporary-cover BMPs include temporary seeding, mulches, matrices, blankets and mats, and the use of soil binders (there may be additional state and local requirements for the use of chemical-based soil binders). Permanent-cover BMPs include permanent seeding and planting, sodding, channel stabilization, and vegetative buffer strips. Silt fence and other sediment control measures are not stabilization measures.

SWPPP Tip!

Final Stabilization

Once construction activity in an area is completed and the area is stabilized (typically by achieving 70 percent permanent vegetative cover), you can mark this area on your SWPPP and discontinue inspections in that area. By bringing areas of your site to final stabilization, you can reduce your workload associated with maintaining and inspecting BMPs. For more information on final stabilization, see Chapter 9.

Example BMP: Temporary Seeding

Description: Temporarily seeding an area to establish vegetative cover is one of the most effective, and least expensive, methods of reducing erosion. This approach, as a single BMP, might not be appropriate on steep slopes, when vegetation cannot be established quickly enough to control erosion during a storm event, or when additional activities might occur soon in the area.

Installation Tips:

- Seed and mulch area (the mulch provides temporary erosion protection by protecting the soil surface, moderating temperature, and retaining moisture while seeds germinate and grow)
- Water regularly, if needed, to ensure quick growth
- Maintain backup BMPs, such as silt fence or settling ponds

SWPPP Tip!

Wind Control BMPs

In areas where dust control is an issue, your SWPPP should include BMPs for wind-erosion control. These consist of mulching, wet suppression (watering), and other practices.

ESC Principle 5: Protect slopes. Protect all slopes with appropriate erosion controls. Steeper slopes, slopes with highly erodible soils, or long slopes require a more complex combination of controls. Erosion control blankets, bonded fiber matrices, or turf reinforcement mats are very effective options. Silt fence or fiber rolls may also be used to help control erosion on moderate slopes and should be installed on level contours spaced at 10- to 20-foot intervals. You can also use diversion channels and berms to keep stormwater off slopes.

Example BMP: Rolled erosion control products

Description: Erosion control products include mats, geotextiles, and erosion control blankets and products that provide temporary stabilization and help to establish vegetation on disturbed soils. Such products help control erosion and help establish vegetation and are often used on slopes, channels, or stream banks.

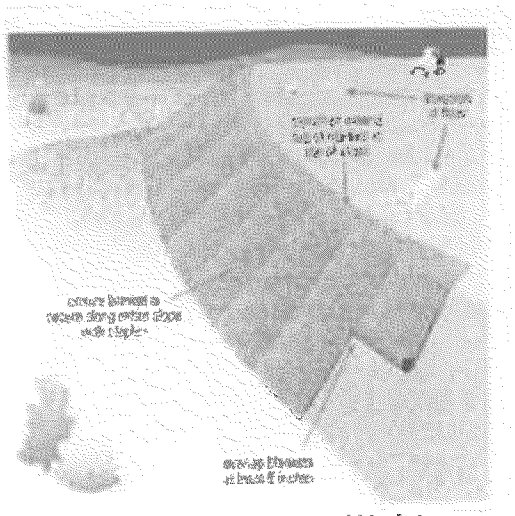


Figure 9. Illustration of erosion control blankets installed on slope.

Installation Tips:

- Use rolled erosion-control products on slopes steeper than 3 to 1 (horizontal to vertical) and in swales or long channels
- Trench the top of the blanket in to prevent runoff from flowing under the blanket
- Overlap the lower end of the top mat over the top of the downslope mat to ensure that runoff stays on top of the blankets and mats
- Staple blankets and mats according to specifications

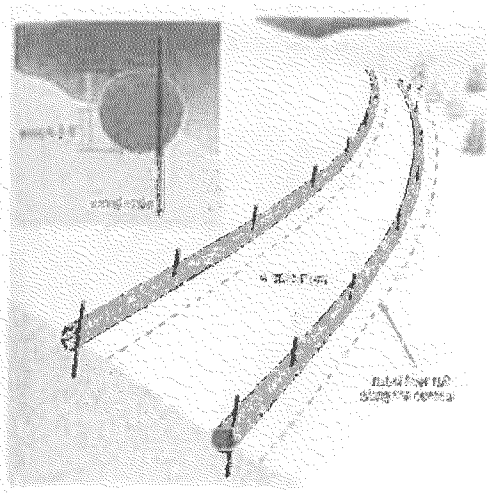


Figure 10. Illustration of a fiber roll installation along a slope.

Maintenance:

- Periodically inspect for signs of erosion or failure
- Repair the blanket or mat if necessary
- Continue inspections until vegetation is established at the level required to qualify as final *stabilization*

ESC Principle 6: Protect storm drain inlets. Protect all inlets that could receive stormwater from the project until final stabilization of the site has been achieved. Install inlet protection before soil-disturbing activities begin. Maintenance throughout the construction process is important. Upon completion of the project, storm drain inlet protection is one of the temporary BMPs that should be removed. Storm drain inlet protection should be used not only for storm drains within the active construction project, but also for storm drains outside the project area that might receive stormwater discharges from the project. If there are storm drains on private property that could receive stormwater runoff from your project, coordinate with the owners of that property to ensure proper inlet protection.

Example BMP: Storm Drain Inlet Protection

Description: Storm drain inlet protection prevents sediment from entering a storm drain by surrounding or covering the inlet with a filtering material. Several types of filters are commonly used for inlet protection: silt fence, rock-filled bags, or block and gravel. The type of filter used depends on the inlet type (for example, curb inlet, drop inlet), slope, and volume of flow. Many different commercial inlet filters are also available. Some commercial inlet filters are placed in front of or on top of an inlet, while others are placed inside the inlet under the grate.

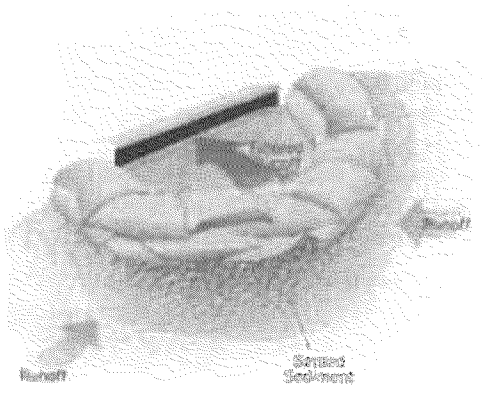


Figure 11. Illustration of a storm drain inlet with rock-filled bags filtering stormwater.

Installation Tips:

- Install inlet protection as soon as storm drain inlets are installed and before land-disturbance activities begin in areas with existing storm drain systems
- Protect all inlets that could receive stormwater from your construction project
- Use in conjunction with other erosion prevention and sediment control BMPs—remember, inlet protection is a secondary BMP!
- Design your inlet protection to handle the volume of water from the area being drained. Ensure that the design is sized appropriately.

Maintenance:

- Inspect inlets frequently and after each rainfall

- Remove accumulated sediment from around the device and check and remove any sediment that might have entered the inlet
- Replace or repair the inlet protection if it becomes damaged
- Sweep streets, sidewalks, and other paved areas regularly

SWPPP Tip!

Storm drain inlet protection should never be used as a primary BMP! Use erosion control techniques such as hydromulching or erosion-control blankets to prevent erosion. Use inlet protection and other sediment control BMPs as a *backup* or last line of defense.

ESC Principle 7: Establish perimeter controls. Maintain natural areas and supplement them with silt fence and fiber rolls around the perimeter of your site to help prevent soil erosion and stop sediment from leaving the site. Install controls on the downslope perimeter of your project (it is often unnecessary to surround the entire site with silt fence). Sediment barriers can be used to protect stream buffers, riparian areas, wetlands, or other waterways.

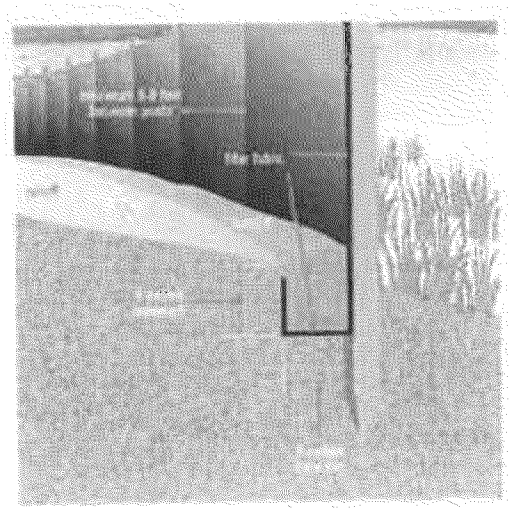


Figure 12. Illustration of proper techniques to use in installing silt fence.

They are effective only in small areas and should not be used in areas of concentrated flow.

Example BMP: Silt Fence and Fiber Rolls

Description: A silt fence is a temporary sediment barrier consisting of a geotextile attached to supporting posts and trenched into the ground. Silt fencing is intended to retain sediment that has been dislodged by stormwater. It is designed only for runoff from small areas and is not intended to handle flows from large slopes or in areas of concentrated flow. Fiber rolls serve the same purpose and consist of an open mesh tubular sleeve filled with a fibrous material which traps sediment. Fiber rolls are generally staked to the ground.

Installation Tips:

DO:

- Use silt fence or fiber rolls as perimeter controls, particularly at the lower or down slope edge of a disturbed area
- Leave space for maintenance between toe of slope and silt fence or roll
- Trench in the silt fence on the uphill side (6 inches deep by 6 inches wide)
- Install stakes on the downhill side of the fence or roll
- Curve the end of the silt fence or fiber roll up-gradient to help it contain runoff

DON'T:

- Install a silt fence or fiber rolls in ditches, channels, or areas of concentrated flow
- Install it running up and down a slope or hill
- Use silt fencing or fiber rolls alone in areas that drain more than a quarter-acre per 100 feet of fence

Maintenance:

- Remove sediment when it reaches one-third of the height of the fence or one-half the height of the fiber roll
- Replace the silt fence or roll where it is worn, torn, or otherwise damaged
- Retrench or replace any silt fence or roll that is not properly anchored to the ground

ESC Principle 8: Retain sediment on-site and control dewatering practices. Sediment barriers described in ESC Principle 7 can trap sediment from small areas, but when sediment retention from a larger area is required, consider using a temporary sediment trap or sediment basin. These practices detain sediment-laden runoff for a period of time, allowing sediment to settle before the runoff is discharged. Proper design and maintenance are essential to ensure that these practices are effective.

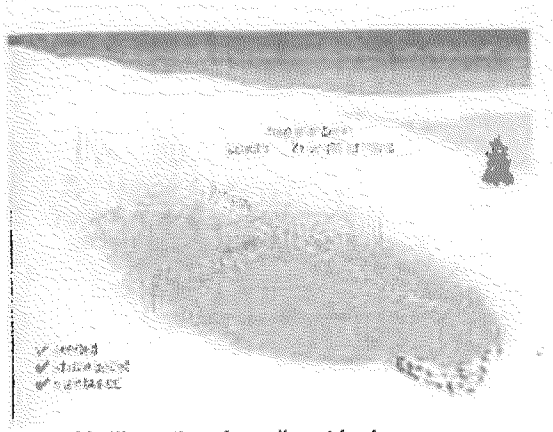


Figure 13. Illustration of a sediment basin.

You should use a sediment basin for common drainage locations that serve an area with 10 or more acres disturbed at any one time. The basin should be designed to provide storage for the volume of runoff from the drainage area for at least a 2-year, 24-hour storm (or 3,600 cubic feet of storage per acre drained, which is enough to contain 1 inch of runoff, if the 2-year, 24-hour calculation has not been performed). Check your permit for exact basin sizing requirements. Sediment basins should be located at low-lying areas of the site and on the down-gradient side of bare soil areas where flows converge. Do not put sediment traps or basins in or immediately adjacent to flowing streams or other waterways.

Where a large sediment basin is not practical, use smaller sediment basins or sediment traps (or both) where feasible. At a minimum, use silt fences, vegetative buffer strips, or equivalent sediment controls for all down-gradient boundaries (and for those side-slope boundaries deemed appropriate for individual site conditions).

Dewatering practices are used to remove ground water or accumulated rain water from excavated areas. Pump muddy water from these areas to a temporary or permanent sedimentation basin or to an area completely enclosed by silt fence in a flat vegetated area where discharges can infiltrate into the ground. Never discharge muddy water into storm drains, streams, lakes, or wetlands unless the sediment has been removed before discharge.

Keep in mind that some states and local jurisdictions require a separate permit for dewatering activities at a site.

ESC Principle 9: Establish stabilized construction exits. Vehicles entering and leaving the site have the potential to track significant amounts of sediment onto streets. Identify and clearly mark one or two locations where vehicles will enter and exit the site and focus stabilizing measures at those locations. Construction entrances are commonly made from large crushed rock. They can be further stabilized using stone pads or concrete. Also, steel wash racks and a hose-down system will remove even more mud and debris from vehicle tires. Divert runoff from wash areas to a sediment trap or basin. No system is perfect, so sweeping the street regularly completes this BMP.

Example BMP: Stabilized Construction Exit

Description: A rock construction exit can reduce the amount of mud transported onto paved roads by vehicles. The construction exit does this by removing mud from vehicle tires before the vehicle enters a public road.

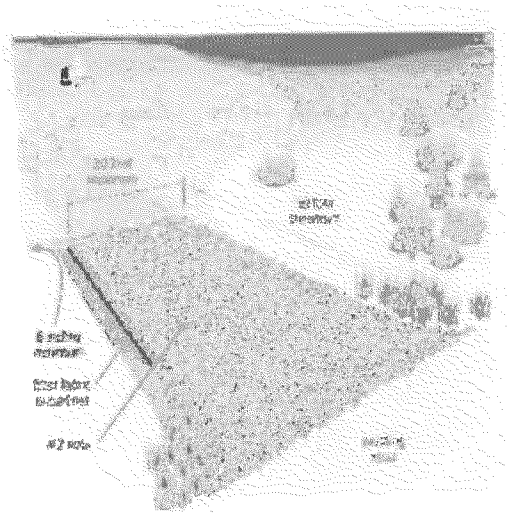


Figure 14. Illustration of a stabilized construction exit.

You might also want to install a wheel wash when mud is especially difficult to remove or space doesn't allow sufficient tire revolutions (four or five are needed) before exiting the site. Direct wash water to a suitable settling area—do not discharge wash water to a stream or storm drain!

Installation tips:

- Ensure that the exit is at least 50 feet long (generally, the length of two dump trucks) and graded so runoff does not enter the adjacent street
- Place a geotextile fabric under a layer of aggregate at least 6–12 inches thick. The stones or aggregate should be 3–6 inches in diameter
- Train employees and subcontractors to use the designated construction exits. Empower your employees to provide directions to subcontractors and others that are not on the site every day

Maintenance:

- Replenish or replace aggregate if it becomes clogged with sediment
- Sweep the street regularly

ESC Principle 10: Inspect and maintain controls. Inspection and maintenance is just as important as proper planning, design, and installation of controls. Without adequate maintenance, erosion and sediment controls will quickly fail, sometimes after just one rainfall, and cause significant water quality problems and potential violations of the NPDES construction general permit. Your permit likely requires you to maintain your BMPs at all times. To do this effectively, you should establish an inspection and maintenance approach or strategy that includes both regular and spot inspections. Inspecting both prior to predicted storm events and after will help ensure that controls are working effectively. Perform maintenance or corrective action as soon as problems are noted. **Inspection and maintenance of BMPs are addressed in more detail in Chapter 6.**

Other Sediment and Erosion Control Techniques

As mentioned at the beginning of this chapter, there are many other erosion and sediment control techniques that can be used effectively. The BMPs highlighted above are among those more commonly used and highlight many general erosion and sediment control principles for which other BMPs may be used effectively. Check to see if your state or local government has developed a BMP design manual for detailed information on any BMP you are considering. Appendix D lists several good BMP design manuals. You can also find out more about various BMPs by visiting EPA's Menu of BMPs at **www.epa.gov/npdes/menuofbmps**

Erosion control measures:

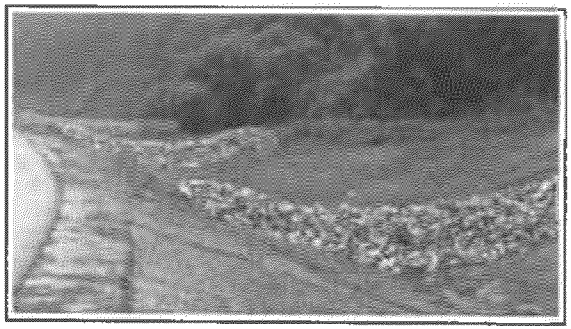
- Surface roughening, trackwalking, scarifying, sheepsfoot rolling, imprinting
- Soil bioengineering techniques (e.g., live staking, fascines, brush wattles)
- Composting
- Sodding

Sediment control and runoff management measures:

- Gravel bag barrier
- Compost berm
- Rock or brush filters
- Baffles, skimmers, or flocculants in sediment basins to increase effectiveness
- Lowering soil levels near streets and sidewalks to prevent runoff
- Level spreaders
- Energy dissipaters
- Check dams

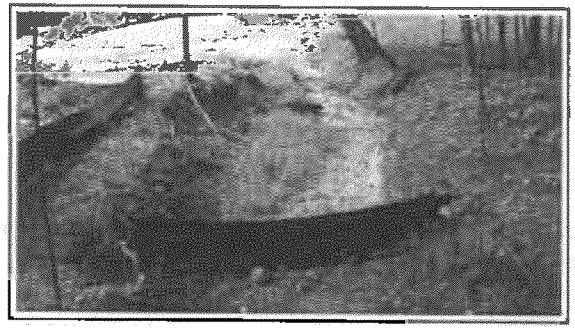
Ditch Check Dams

Small temporary dikes of stone or other material used to prevent downcutting and trap sediment.



Good check dam placement and construction. Sidewalls are tied into banks. **GOOD**

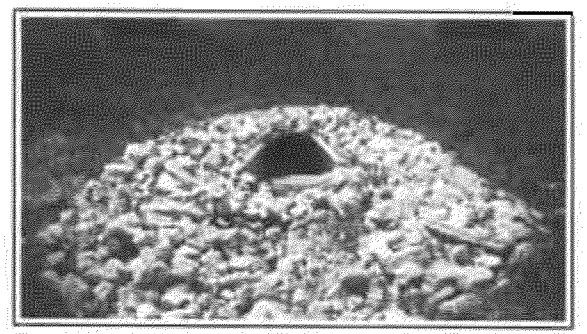
FAIR Fair check dam construction. Bales are not properly placed or secured to sides of ditch.



Silt fencing is a poor choice for check dam construction. **POOR**

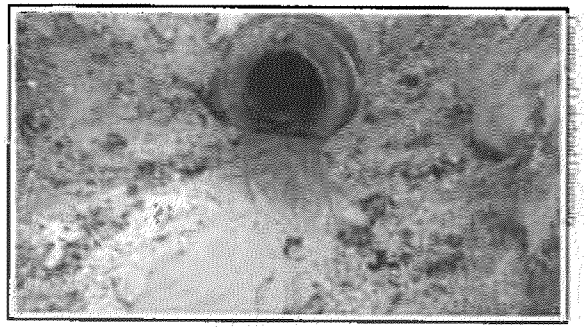
Outlet Protection

Goal is to prevent erosion by using rip-rap to decrease the velocity of exiting water from pipes, traps, and basins. Watch for ruts and other eroded areas.



Good placement of rip-rap to control erosion at outlet. Good mix of rock sizes and very nice coverage. **GOOD**

FAIR Some soil stabilization is present, but more rip-rap is necessary downstream of the drain for erosion control.



No outlet protection utilized. Severe erosion is evident. **POOR**

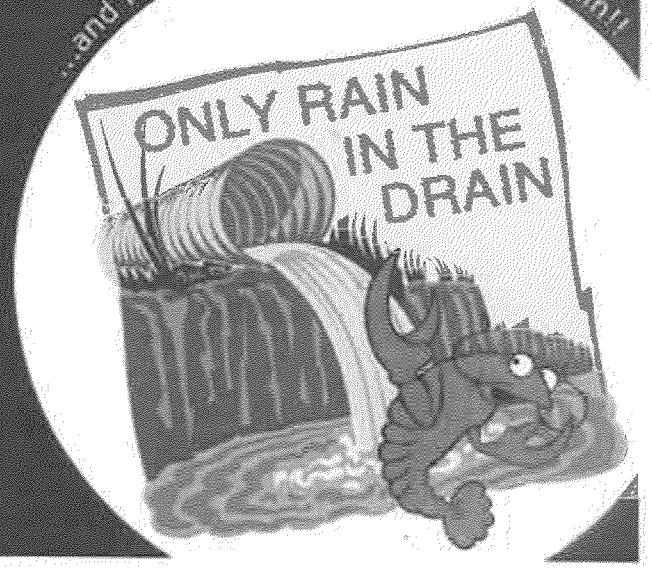
NORTHWESTERN INDIANA REGIONAL PLANNING COMMISSION
"Together We Make the Difference"

INDIANA LAKE MICHIGAN COASTAL PROGRAM

EROSION AND SEDIMENT FIELD GUIDE to BEST MANAGEMENT PRACTICES

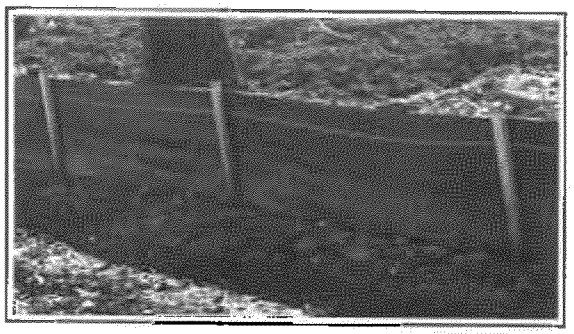
*Copy the **Site Report Card** on the back panel, and fill out a report for each site you visit. Don't forget to respect private property though!*

...and Remember, Only Rain in the Drain!!



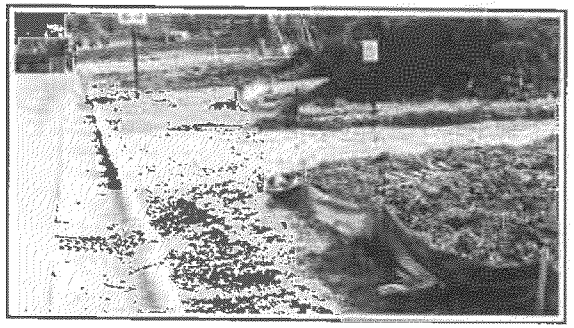
Sediment Barrier

Goal is to trap soil and slow runoff velocities. Watch for overtopping, poor maintenance, and proper placement of silt fencing.



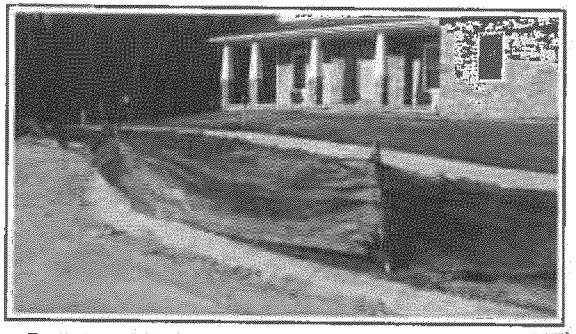
Excellent installation of temporary silt fencing, with posts on the downhill side and no visible bypasses.

GOOD



FAIR

Fair silt fencing, but lacks proper maintenance and attention to bypasses.

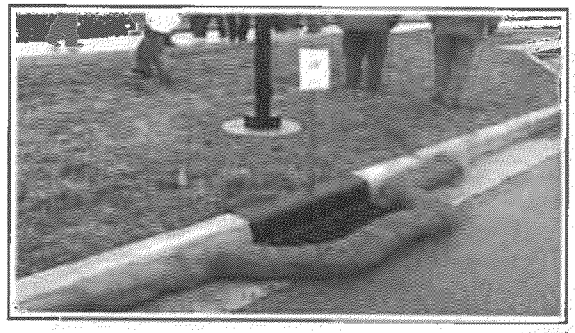


Posts are on the incorrect side and the fencing has not been trenched properly.

POOR

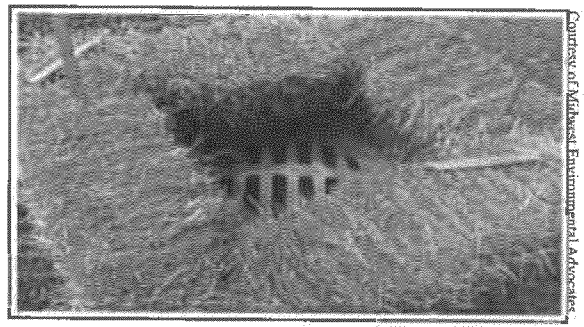
Curb Inlet Protection

Goal is to place berms and filters at curb drains in order to filter muddy runoff. Watch for poor maintenance and bypasses.



Good placement against curb and a nice tight fit.

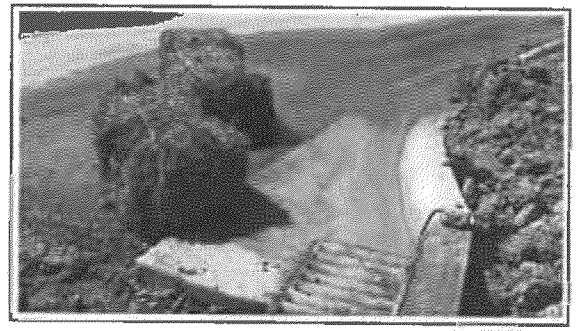
GOOD



Courtesy of Midwest Environmental Advocates

FAIR

A thick geosynthetic liner would filter better than a short stack of straw.



Bales of straw are being used to channel muddy water into the storm drain.

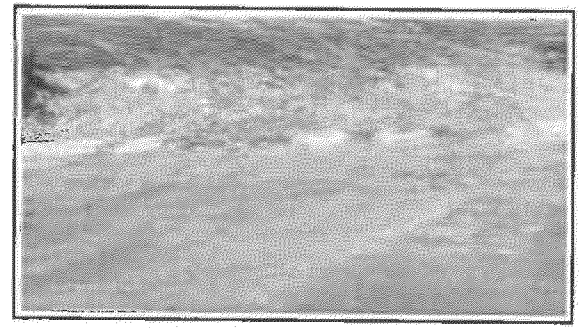
POOR

Construction Exit

Goal is to create one entrance for all contractors to use in order to keep tires clean and prevent sediment from being tracked onto the roadway.

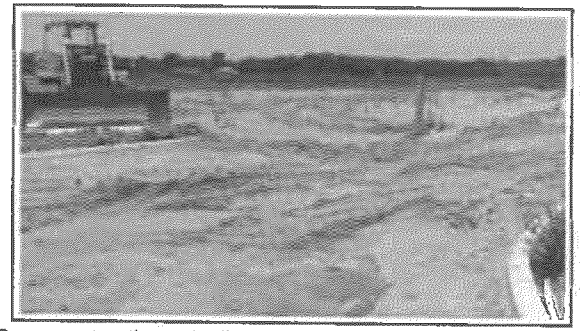
Good construction incorporates geotextile fabric under the required six inches of stone.

GOOD



FAIR

Fair construction exit using inadequate stone with some sediment tracking.

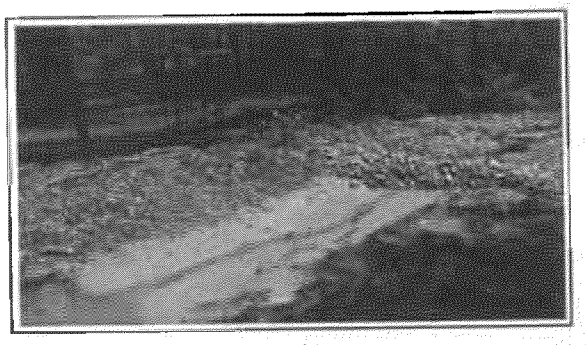


Poor construction exit allows sediment to be tracked onto streets and into sewer systems.

POOR

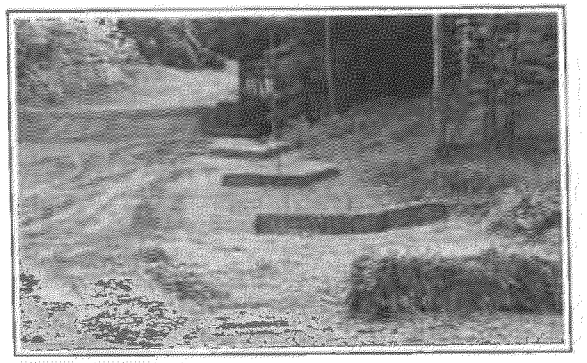
Sediment Trap

Goal is to create berms of rock and brush that will intercept and slow runoff, allowing it time to settle the sediment out. Overflow should be in the center of berms.



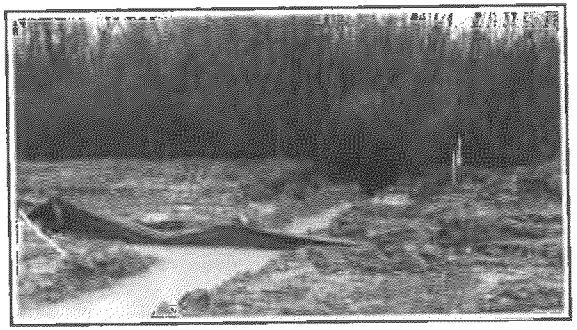
This stone spillway provides a stable overflow structure and can hold back larger amounts of sediment.

GOOD



FAIR

This setup appears to be working fairly well, but ensure that bales are held securely in place.

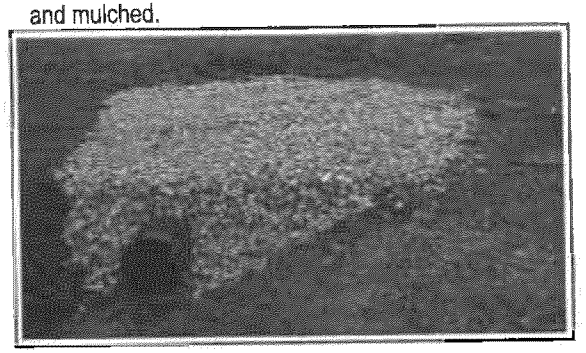


Silt fencing is never to be used as an outlet structure for a

POOR

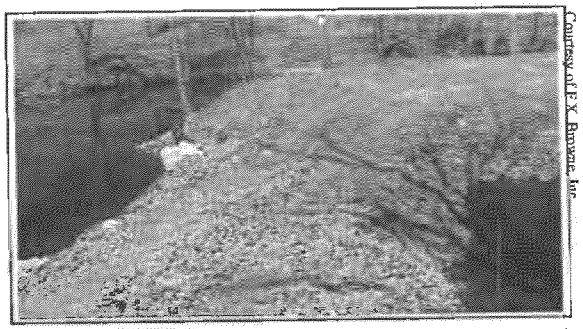
Stream Crossing

Culverted stream crossings are constructed of stone, rock, or recycled concrete. No soil of any type is permitted. Disturbed areas should be temporarily seeded and mulched.



A properly installed culvert installed with stone and seeding stabilizes the stream crossing site.

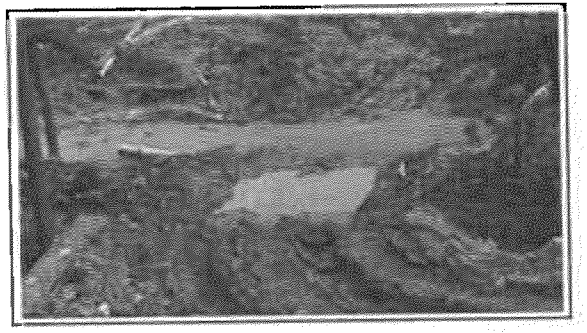
GOOD



Courtesy of F.X. Browne, Inc.

FAIR

Sturdy temporary stream crossing, but seeding on the far bank would limit runoff.

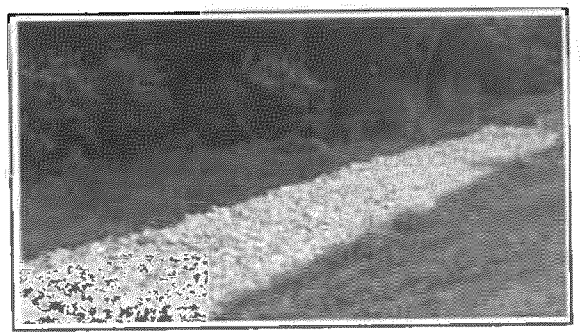


Not using the proper procedure causes massive amounts of sediment discharge.

POOR

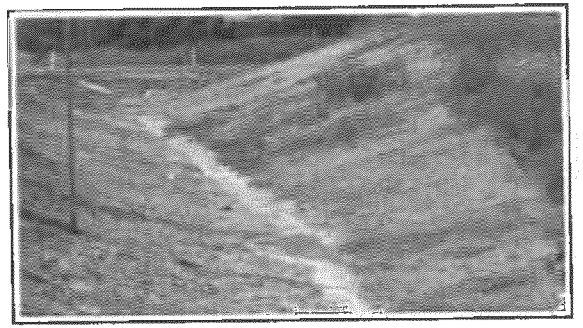
Ditch Protection

All ditches should be seeded and mulched with straw or blanket or lined with rock after construction.



Good ditch construction- rock lining with ample vegetation on slopes.

GOOD



FAIR

Fair ditch construction- too thinly seeded.

Poor ditch construction- no seeding or mulching provided.

POOR

SITE REPORT CARD

Date Visited: _____ Site Name: _____

Site Location: _____

Streams Onsite: _____ Drains To: _____

Weather During Visit: _____ Rain In Prior 24 Hrs: ❑ yes ❑ no

Type Of Project: ❑ Commercial ❑ Residential ❑ Utility ❑ Roadway/DOT

Project Owner & Address: _____

_____

BEST MANAGEMENT PRACTICE — GRADE *circle one*

Refer to images & text found in this Field Guide to grade items 1 thru 6.

	A	B	C	D	F
1. Construction Exit					
a. Is dirt being tracked into road?		❑ no		❑ yes	
b. Are construction materials or equipment being stored on the construction exit or stone pad?		❑ no		❑ yes	
2. Sediment Barriers (Silt Fences, Hay Bales, etc.)					
a. Are the silt fences falling down?		❑ no		❑ yes	
b. Are the silt fences not properly trenched?		❑ no		❑ yes	
c. Are they creating a point source conduit for the water?		❑ no		❑ yes	
d. Are the silt fences over half full of sediment?		❑ no		❑ yes	
3. Temporary Sediment Traps/Filters					
a. Check Dam - Is check dam placed in State/US waters?		❑ no		❑ yes	
b. Rock Filter Dam - Is not installed according to approved plan?		❑ no		❑ yes	
c. Curb Inlet - Inlet is not protected from runoff with curb protection?		❑ no		❑ yes	
4. Temporary Sediment Basins					
a. Is structure placed in waters of State/US?		❑ no		❑ yes	
b. Is sediment reaching outlet/outfall pipe?		❑ no		❑ yes	
c. Is it missing a stone filter and trash rack?		❑ no		❑ yes	
d. Is a stone outlet protection missing?		❑ no		❑ yes	
e. Is the basin without vegetation stabilization?		❑ no		❑ yes	
5. Storm Drain Outlet Protection					
a. Is filter fabric missing between soil and rip-rap/stones?		❑ no		❑ yes	
b. Are rip-rap/stones missing or too small?		❑ no		❑ yes	
c. Have rains dislodged rip-rap/stones?		❑ no		❑ yes	
6. Soil Cover (Mulch, Temp. or Perm. Vegetation)					
a. Has the soil been disturbed and inactive for 14 days?		❑ no		❑ yes	
b. Is the straw/hay mulch spread unevenly with a depth less than 2 - 4 "?		❑ no		❑ yes	
c. Has the site been left unstabilized and without vegetation?		❑ no		❑ yes	

Based on your observations grade the following:

	A	B	C	D	F
7. Encroachment on Stream Buffer					
a. Has vegetation been removed adjacent to any streams?		❑ no		❑ yes	
b. Have any structures been placed within the buffer or streams?		❑ no		❑ yes	
Trout Stream = 50 ft. *(Refer to Trout Stream Map for designation.)*		❑ no		❑ yes	
Other Stream = 25 ft. *(Contact local authority for specific stream ordinances.)*		❑ no		❑ yes	
8. Sediment Contained on the Site Complete Containment = A	A	B	C	D	F
9. Stream Color Before & After Rain No difference = A	A	B	C	D	F
10. Pavement Clear of Sediment (Washed or Tracked) Clear Pavement = A	A	B	C	D	F
Overall Grade	A	B	C	D	F

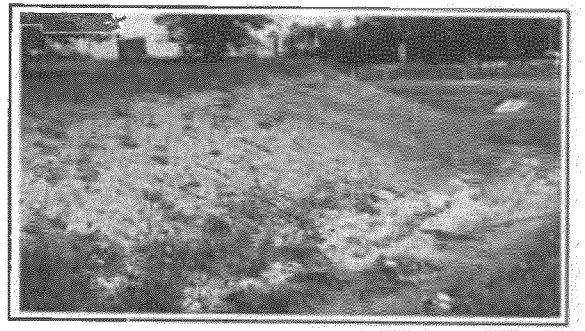
Place your community's contact information sticker here.

Designed and adapted from the Kentucky Waterways Alliance Field Guide. Visit their website at www.KWAlliance.org.

SEEDING AND MULCHING

Must be completed within 21 days after final grading. Slopes of 2H:1V or steeper need blankets, mats or hydroseeding.

Good seeding promotes thick, even growth, reducing erosion from new construction sites. **GOOD**

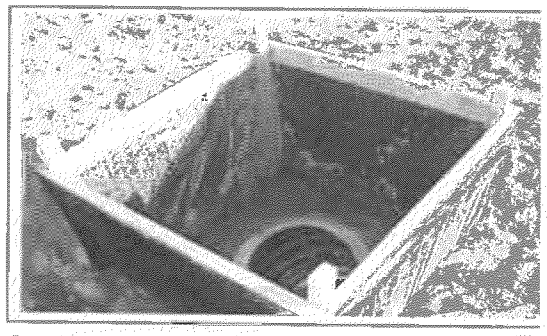


FAIR Fair seeding on slopes- note erosion patterns, and sparse growth pattern.

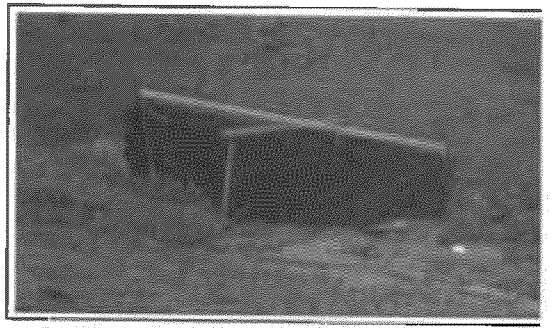
Soil erosion is inevitable with improper seeding. **POOR**

DROP INLET PROTECTIO

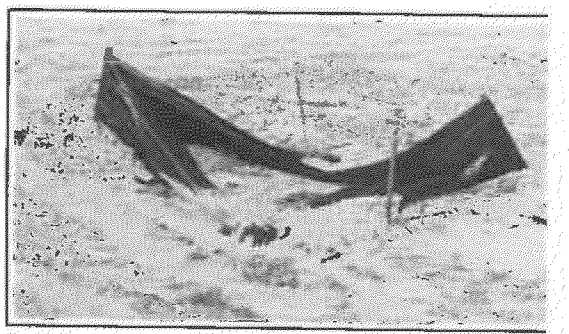
Dikes, berms and filters should pond/settle or fil soil from runoff. Look for bypasses, torn filters or pc ponding (rapid flow-through).



Good berm construction- bottom of sides are tightly in place, keeping sediment out of drain. **GOO**



FAIR Fair berm construction- side need stronger reinforcemen for best performance.



Poor berm construction- sides no longer intact due to lack of proper reinforcement. **POOR**